

Work Order ID 67397

Friday, March 18, 2011 6:39:51 AM

Page 1

Item ID: K358-044-001

Accept

Setup Start

Revision ID:

Stop

Item Name: Reservoir Bottle L62W-001

Start Date: 3/18/2011 Start Qty: 4.00

Cust Item ID:

Required Date: 4/6/2011 Req'd Qty: 4.00

Customer:

Reference:

Approvals:

Process Plan: CLDate: 11/03/18 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

N/A

Rev N/A

100

0.00



PURCHASING

Purchasing

Memo

0.00

Purchasing

Issue P/O: 13676 to Luxfer
P/N: L62W-001 Hoop Wrapped Cylinder
6.89" O.D x 20.75" long

Volume = 549 cu in Weight = 16.5 lbs Service Pressure = 3000 psi

Thread size = 1.125-12 UNF

Certificate of conformity is required

CL 11/03/18 (4)

110

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Receive & Inspect For Transit Damage Ensure certificate of conformity is attached

Paul 9 (4)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

Work Order ID 67397

Friday, March 18, 2011 6:39:51 AM



Page 2

Item ID: K358-044-001

Accept



Setup Start



Revision ID:

Stop



Item Name: Reservoir Bottle L62W-001

Start Date: 3/18/2011 Start Qty: 4.00



Cust Item ID:

Required Date: 4/6/2011 Req'd Qty: 4.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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112

QC6- Inspect dimensions to drawing

0.00



QC

Memo

0.00

8 11/05/10

(x4)

Quality Control

114

Spray Painting per QSI005 4.2

0.00



SprayPaint

Memo

0.00

Spray Painting

PRIME AND PAINT AS PER DWG

RT

11-05-12

(x4)

116

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

8 11/05/13

(x4)

Quality Control

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 67397

Friday, March 18, 2011 6:39:51 AM

Page 3

Item ID: K358-044-001

Accept

Setup Start

Revision ID:

Stop

Item Name: Reservoir Bottle L62W-001

Start Date: 3/18/2011 Start Qty: 4.00

Cust Item ID:

Required Date: 4/6/2011 Req'd Qty: 4.00

Customer:

Reference:

Run Start

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

120

Identify as per dwg & Stock Location: _____

0.00



Packaging

Memo

0.00

Packaging

130

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

11/5/13 (4)

OK 11/05/13

11/05/13

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng		Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Friday, March 18, 2011 6:39:48 AM

Page 1

Work Order ID: 67397

Parent Item: K358-044-001

Parent Item Name: Reservoir Bottle L62W-001




Start Date: 3/18/2011

Required Date: 4/6/2011

Start Qty: 4.00

Required Qty: 4.00

Comments: IPP Rev:A 03.09.11 New issue KJ/DS

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
K358-044-001P  Reservoir Bottle L62W-001		Purchased	No			110	Each	0.0000	1	4		3/18/11 (9)	

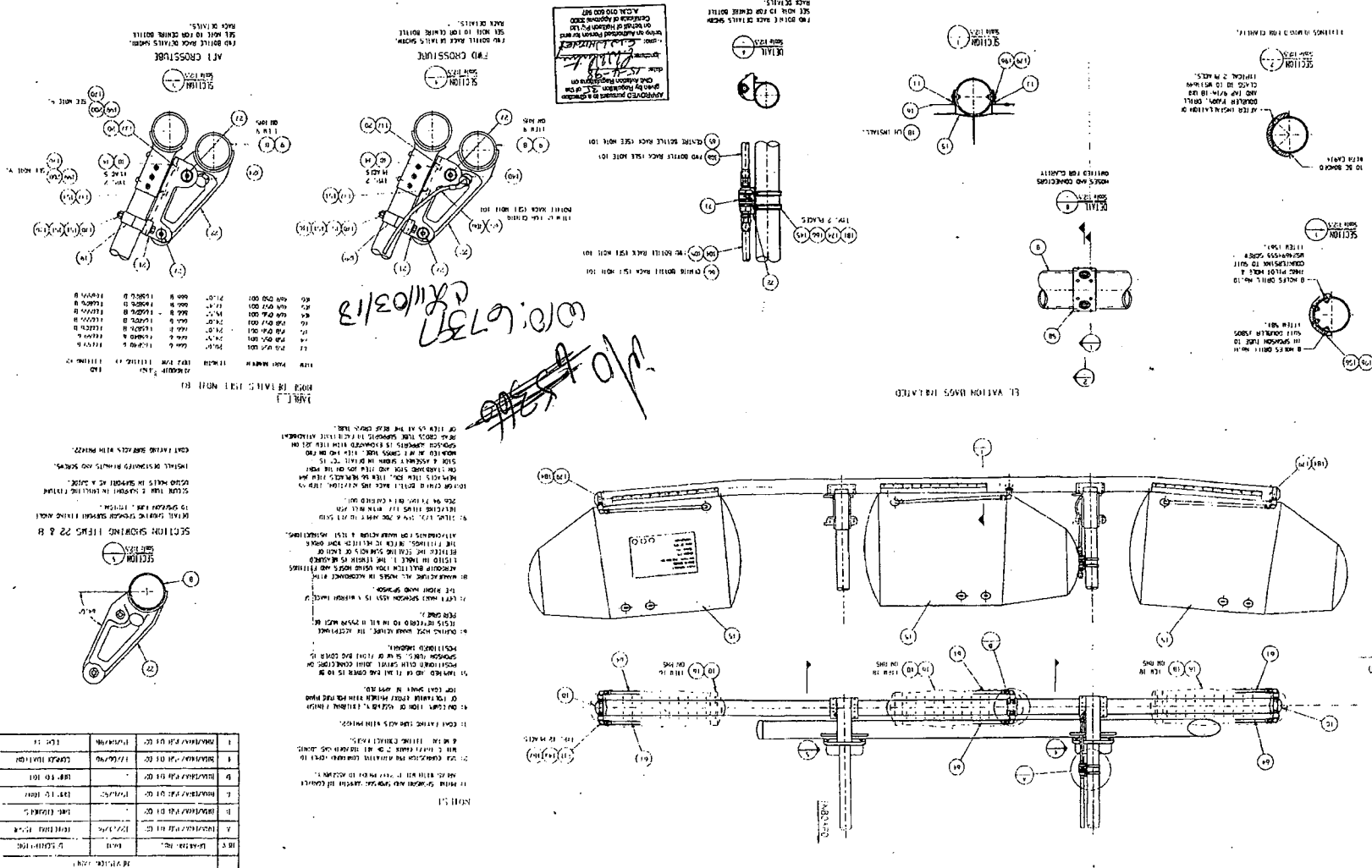
W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

[illegible]

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

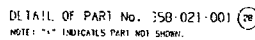
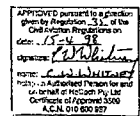
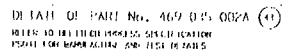
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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2	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1
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9	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1
10	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1	1. 1. 1996. 12. 1



REVISIONS		MANUFACTURING OPERATIONS		MATERIAL		DIMENSIONS IN INCHES UNLESS NOTED				Client	
DATE	BY	REVISIONS	OPERATIONS	MATERIAL	DIMENSIONS	DATE	BY	REVISIONS	Client	HELITECH PTY. LTD.	
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W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

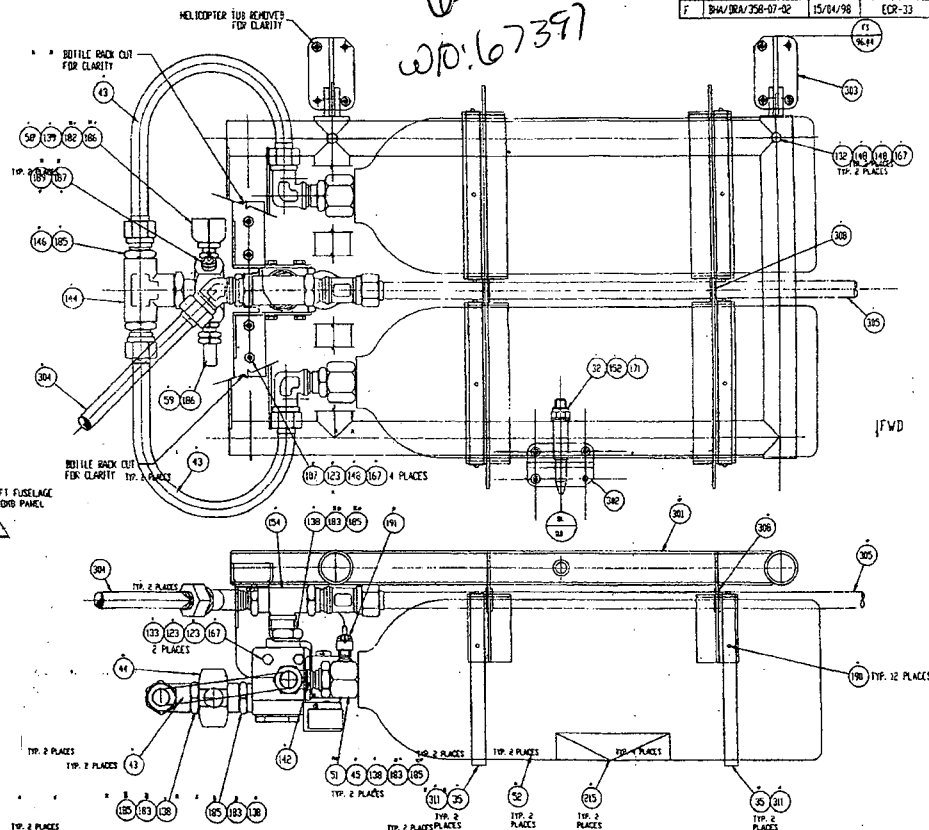
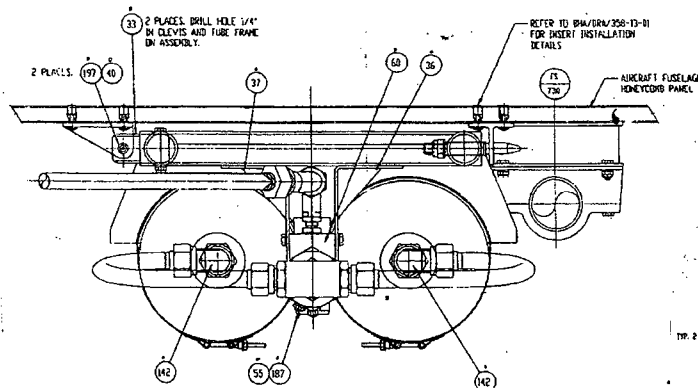
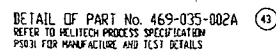
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

~~65246~~
wp: 67397



DETAIL OF ASSEMBLY 469-021-001 (29)

NOTE: * INDICATES PART NOT SHOWN
HELICOPTER STRUCTURE & MOUNTS OMITTED FOR CLARITY

[illegible]

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

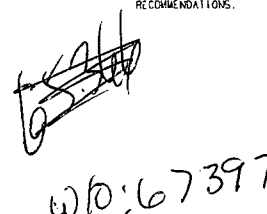
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action		Sign & Date	Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng				

NOTE: Date & initial all entries

NDRES:

2: ALL WIRING & WIRE ROUTING IN ACCORDANCE WITH
AE43.13-1A, CHAP 11 & COMPONENT MANUFACTURER
RECOMMENDATIONS.



- APPLICABLE TO AIRCRAFT
SERIAL NUMBERS 914 TO 1657.

APPROVED pursuant to a direction
given by Regulation 35 of the
Civil Aviation Regulations on
date: 15-4-98
signature: C. W. Whitmore
name: C. W. Whitmore
being an Authorised Person for and
on behalf of Halltech Pty Ltd
Certificate of Approval 3300
A.C.N. 010 690 987

[illegible]

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

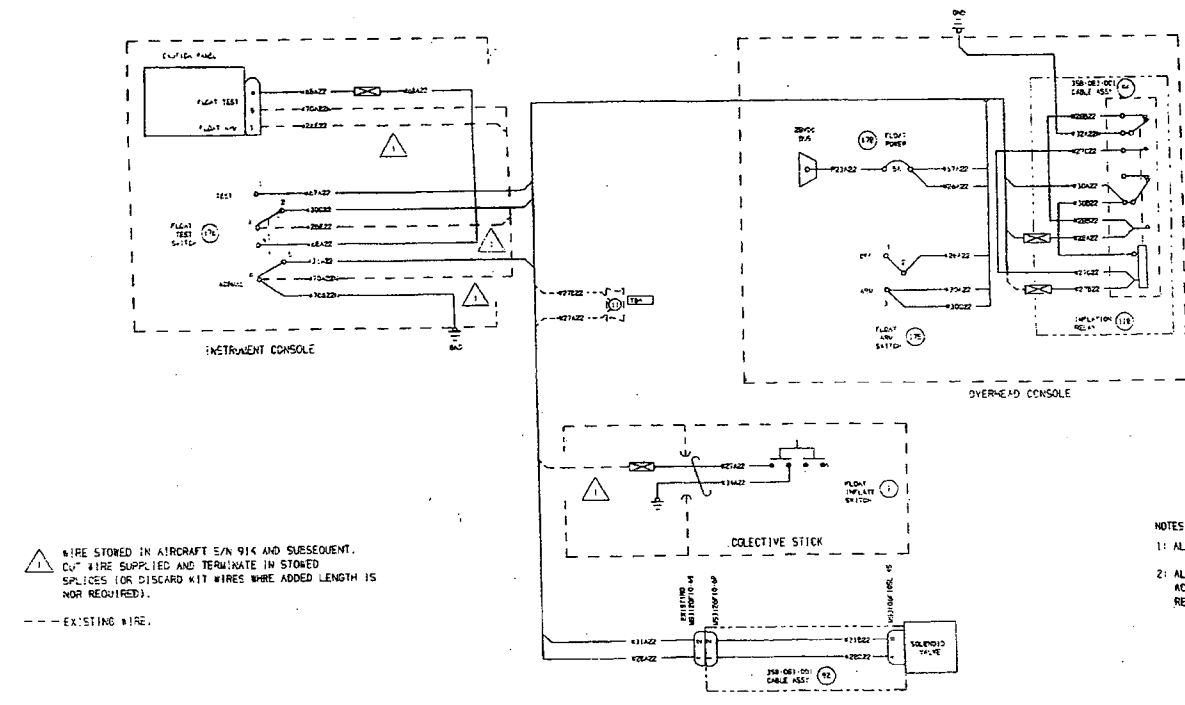
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

REV.	DESCRIPTION	DATE	BY
1	ISSUED	15/04/98	WFO
2	CHANGES		
3	CHANGES		
4	CHANGES		
5	CHANGES		
6	CHANGES		
7	CHANGES		



WIRE STORED IN AIRCRAFT S/N 914 AND SUBSEQUENT.
CUT WIRE SUPPLIED AND TERMINATE IN STORED
SPICES (OR DISCARD KIT WIRES WHERE ADDED LENGTH IS
NOT REQUIRED).
--- EXISTING WIRE.

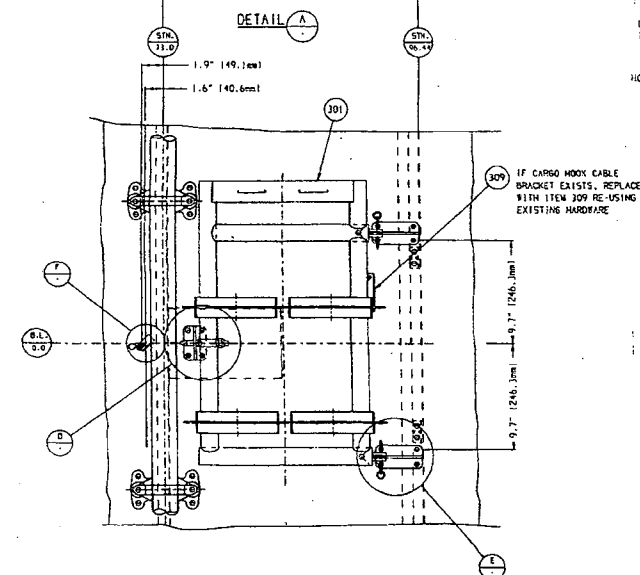
NOTES:
1: ALL WIRING TO MIL-8-61044.
2: ALL WIRING & WIRE ROUTING IN ACCORDANCE WITH
AC43.13-1A, CHAP 11 & COMPONENT MANUFACTURER
RECOMMENDATIONS.

APPROVED pursuant to a direction
given by Regulation 3C of the
Civil Aviation Regulations on
date: 15-4-98
signature: *[Signature]*
name: *[Name]*
being an Authorised Person for and
on behalf of Helitech Pty Ltd
Certificate of Approval 3300
A.C.N. 010 600 987

APPLICABLE TO AIRCRAFT
SERIAL NUMBERS 1658 & SUBSEQUENT

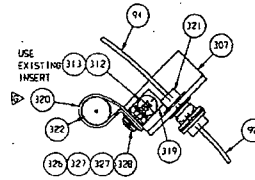
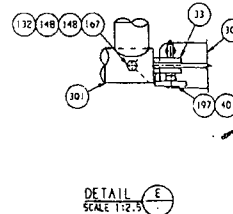
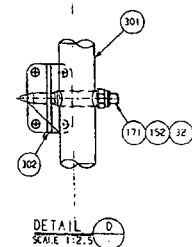
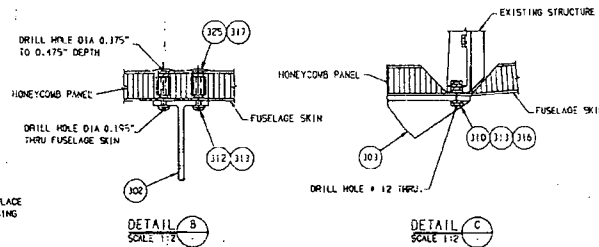
REFERENCE DRAWINGS	MANUFACTURING OPERATIONS	MATERIAL	DIMENSIONS IN MM	Helitech	REV.	WIRING	DATE	SCALE	DESIGNED BY	DATE PLOTTED	335	117, 118	335	117, 118	335	117, 118	335	117, 118
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Figure 1 is an elevation view of the existing structure and the proposed composite panel. The diagram shows a cross-section of a bridge or overpass. Key components labeled include: VERTICAL CONTROL TURN, COMB PANEL, CROSSSTIFF, and EXISTING STRUCTURE. Dimensions are provided at the bottom: 3.5' (87.9mm) and 196.6mm. Callouts 1, 2, and 3 indicate specific points of interest.



FORWARD BOTTLE RACK INSTALLATION

FBI



DETAIL F
SCALE 1:1
ITEM 322 WIRE/WASHER
ATTACHMENT OMITTED
FOR CLARITY

[illegible]

FORWARD

AFT

SEE DRAWING SHAWDRUP P&B 01 G1 FOR DETAIL.

SEE DRAWING SHAWDRUP P&B 01 G1 FOR DETAIL.

W10:67397

APPROVED pursuant to a direction
given by Regulation 36 of the
Civil Aviation Regulations on
date: 15-4-98
signature: [Signature]
name: C. W. [Signature]
being an Authorized Person for as
on behalf of Habbash Pty Ltd
Certificate of Approval 53000
A.C.M. 010 800 987

[illegible]

SEE DRAWING
DWA/PWA/136 017 02
FOR DETAIL.

A.2
9.8

1 (REWARD)

AF 1

~~65344~~
W12.67397

APPROVED pursuant to a direction
given by Regulation 3C of the
Civil Aviation Regulations on
date: 15-4-98
signature: [Signature]
name: C. W. [Name]
being an Authorized Person for as
on behalf of Mallesh Fly Ltd
Certificates of Approval 3300
A.C.N. 010 620 887

[illegible]



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PO REPRINT

Purchase Order ID PO13676

Purchase Order Date 3/18/2011

PO Print Date 3/21/2011

Page Number 1 of 1

Order From :

VU-LUX001

LUXFER GAS CYLINDERS
3016 KANSAS AVENUE
RIVERSIDE, CA 92507
US

Contact Name

Vendor Phone 951 684 5110

Vendor Fax 951 328 1117

Vendor Account Nbr

Buyer

Chantal Lavoie

Requisition Nbr

10127-2607

Tax Resale Nbr

Terms

Net 30

Currency

USD

FOB

Destination-Collect

REVISED

Ship To :

DART AEROSPACE LTD

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

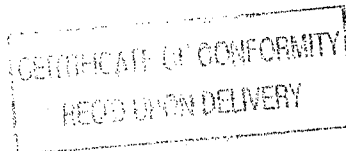
Line Nbr	Reference Revision ID Vendor Part Number	Description/ Mfg ID	Req Date/ Taxable	Req. Qty/ Unit of Measure	Ship Method	Unit Price	Extended Price
1	K358-044-001P	Reservoir Bottle L62W-001	5/6/2011 Yes	4.00 Each	FedEx PI collect	\$239.2500	\$957.00

Special Inst:

AS PER DWG K358-044-001 REV.F
B67397
LUXFER P/N: L62W-001 HOOP
WRAPPED CYLINDER
6.89" O.D X 20.75" LONG
VOLUME = 549 CU IN WEIGHT =
16.5 LBS SERVICE
PRESSURE = 3000PSI THREAD SIZE
= 1.125-12 UNF

PO Total:

\$957.00



CL

No substitution or deviation without
consent.
Certificate of Conformity or Material
Certification required when applicable

Change Nbr: 2

Change Date: 3/21/2011



Luxfer Gas Cylinders
 A Division of **Luxfer Inc.**
 3016 Kansas Avenue • Riverside • CA 92507
 Telephone (951) 684-5110 • Fax (951) 328-1117
 www.luxfercylinders.com



PACKING LIST

Shipping Address

DART AEROSPACE LTD
 1270 ABERDEEN STREET
 HAWKESBURY ON K6A 1K7
 CANADA

Information

Document No.	80201384	
Document Date	05/06/2011	
PO No.	13676	
PO Date	03/18/2011	
Sales Order No./Date	106411	03/18/2011
Customer No.	3464	
Shipping Conditions	Standard	
Terms of Delivery	FOB LUXFER PLANT, COLLECT	
Gross Weight	70.280	LB
Net Weight	59.600	LB
Volumes	3.400	FT3

1 of 1

Shipping Details

Item	Material Description	Storage Location	Quantity	Weight
0010	FEDEX P1 / COLLECT ACCT #15179324-0 L62W-001 CYLINDER, ALUMINUM FIBERWRAPPED, 62 CF Plant : 62 BASE MODEL L62W SERVICE PRESSURE 4500 PSI SURFACE FINISH HOOPWRAPPED WITH FIBERGLASS THREAD 1.125-12 UNF 2B, STD GLAND INTERNAL FINISH THERMO CLEANED LABEL CUSTOM LABEL APPLIED APPROVING AUTHORITY DOT/TC - USA DOT/TRANS CANADA	1	4 EA Silosho 1 EA	70.280 LB
0020	TEST REPORT GOVERNMENT INSPECTION REPORT Plant : 62			



Luxfer® Gas Cylinders Composite Cylinder Division

CERTIFICATE OF CONFORMANCE

CUSTOMER: DART AEROSPACE LTD
1270 ABERDEEN STREET
HAWKESBURY ON K6A 1K7
CANADA

DATE: 5/06/2011

CUSTOMER P.O. NO. : 13676

LUXFER S.O. NO. : 106411

CUSTOMER DRAWING NO. : N/C

REV. NO. : N/C


ITEM	LUXFER PART NO.	REV	SAMPLE PLAN	DESCRIPTION	QUANTITY
1	L62W-001	E	N/A	COMPOSITE CYLINDERS 549 CU. IN. / 3000 PSI	4

PREFIX:	WS
SERIAL NUMBERS:	5349,5350,5352,5353

We hereby certify that all materials of construction, processes of manufacture, required inspections and tests meet all applicable specification requirements. Material certifications, inspection and test results are available for review. We also certify that the above listed product items satisfactorily meet all purchase order, drawing and specification requirements for the revisions identified except for the following:

EXCEPTIONS:	None.
--------------------	-------

NAME: Robert Felix

SIGNATURE: 

TITLE: Shipping Coordinator

DATE: 5/06/2011

3016 Kansas Ave.
Riverside, CA 92507
USA
Tel: (909)-684-5110
Fax: (909) 341 9223

Setting the Standard Worldwide®

CCD-II-96-33

Our
Fi

Our
Order.....

Client's Order.....

Arrowhead Industrial Services USA, Inc.

Report of Manufacture of Filament Reinforced Plastic (FRP)
Seamless Aluminum-Liner Compressed Gas Cylinder

Report
No. AISI-20256
Sheet No. 1
of 7 Sheets

Date: April 20, 2011

Manufactured By: Luxfer Gas Cylinders
Located at: 3016 Kansas Ave. Bldg. #3
Riverside, California 92507

Manufactured For: Dart Aerospace LTD
Located at: 1270 Aberdeen Street
Hawkesbury ON, K6A 1K7
Canada

Cosigned to: Same as above
Located at:

Part number: L62W-001

Quantity: 5 **Size:** 7.06 in./ 179.00 mm outside diameter by 20.75 inches / 527.00 mm long.
Quantity Shipped: _____ 549.0 cu.in./ 9.0 liter

MARKS PLACED ON IMBEDDED LABELS ARE:

TC-3HWM 207
DOT-SP 7235-3000

Serial Number WS5349 to WS5363 inclusive, except as noted on hydrostatic test sheet

Identifying Symbol (registered) LUXFER

Inspector's Mark:



Other Marks:

Test Date: 4-11

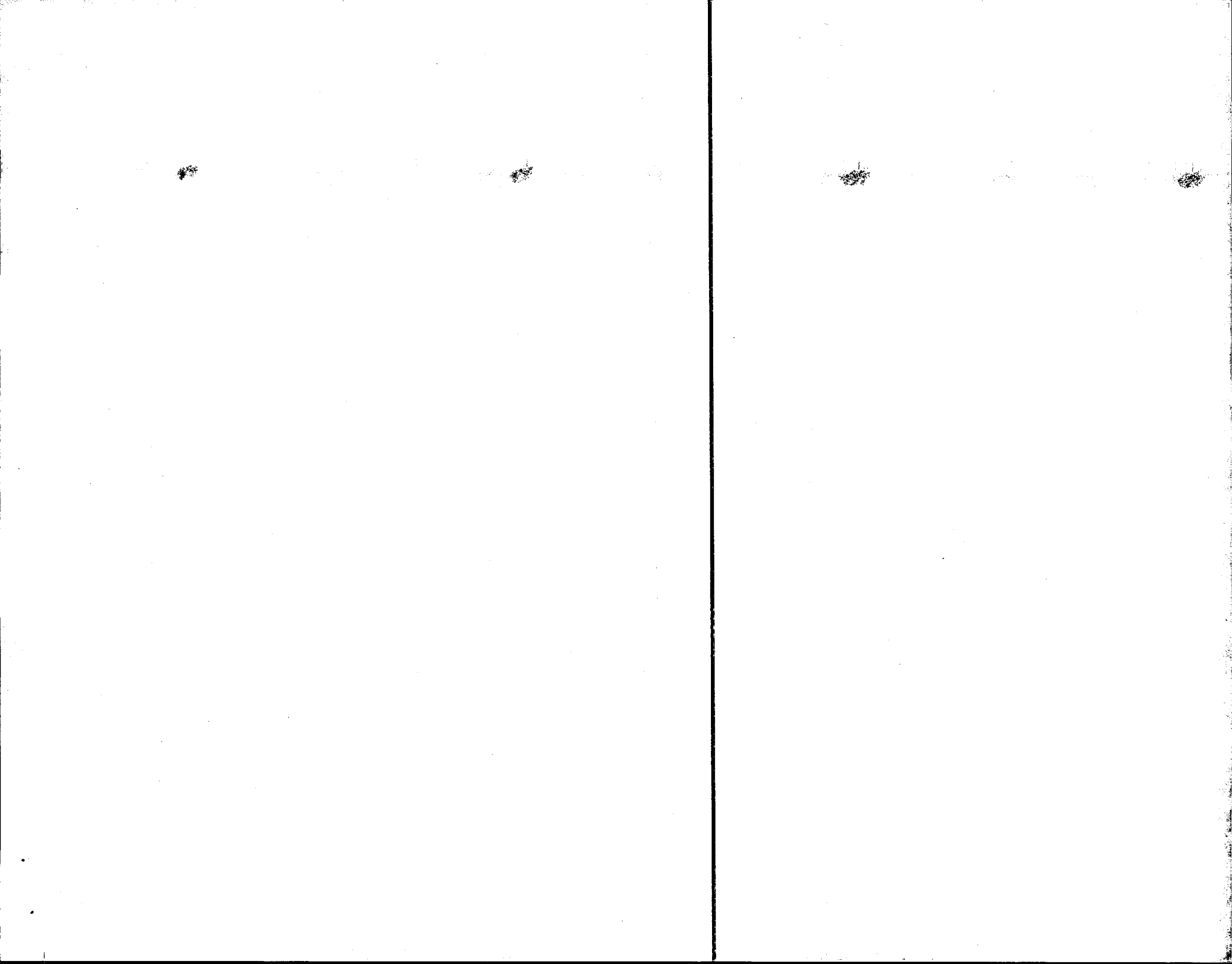
ELASTIC EXPANSION RANGE 90-120 CC

Additional marks stamped on cylinder/neck face are individual liner serial numbers.

Each composite cylinder was made by completely overwrapping a seamless aluminum liner with resin impregnated filament reinforcement. Liners were made by forming a shoulder and neck on the open end of an aluminum seamless shell. Composite overwrap was made by winding resin impregnated commercial S-2 fiberglass continuous filament over the liner in circumferential directions followed by curing of the resin at controlled temperature.

Aluminum was identified by heat numbers and verified as to chemical analysis record thereof is attached hereto. Liners fabricated from the aluminum were solution treated and artificially aged to T-6 temper. Physical test were made in the presence of the inspector and report of results of specimens taken from these liners is attached hereto.

Each liner was inspected both before and after closing in the ends. All that were inspected were found to be free from seams, cracks, laminations and other defects, which might prove injurious to the strength of the cylinder.



Arrowhead Industrial Services USA, Inc.

Report of Manufacture of Filament Reinforced Plastic (FRP)

Seamless Aluminum-Liner Compressed Gas Cylinder

Liner walls were measured and the minimum was found to be .247 inches/ 6.27 mm. The outside diameter was found by a close approximation to be 6.9 inches/ 175.0 mm.

Flattening test was made in the presence of an Inspector and found to be in compliance with the requirements.

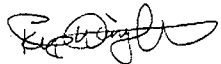

Filament and resin components were certified by the manufactures, identified by lot number. Filament was verified as to strength. Composite was verified as to shear. Record thereof is attached hereto.

Aluminum stresses were calculated to be 31219 PSI / 215.25 Nmm² at service pressure. Fiber stresses are calculated to be 75224 PSI / 518.65 Nmm² at service pressure.



Autofrettage and hydrostatic test, as prescribed, were made in the presence of the Inspector. All cylinders accepted were in compliance with requirements. Results of autofrettage and test pressurization are attached hereto.

I hereby certify that the cylinders proved satisfactory in every way and comply with the stated requirements of DOT-SP 7235 and TC-3HWM 207.

Signed: _____

 
Kip Wirtzfeld
AISI CCD Supervisor

Signed: _____

 
Steven T Hutchinson
AISI Certifying Inspector

Place: Riverside, CA 92507

Date: April 20, 2011

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
RIVERSIDE, CALIFORNIA

REPORT OF MANUFACTURE OF FRP SEAMLESS ALUMINUM-LINED CYLINDERS
RECORD OF CHEMICAL ANALYSIS

MANUFACTURED BY: LUXFER COMPOSITE CYLINDERS DIVISION
FOR: DART

Reporting Date: 20 Apr 2011
Symbol: LUXFER

ALUMINUM ALLOY 6061

NUMBERED WS5349 to WS5353 inclusive.

MILL HEAT CODE*	HEAT NO.	CHECK ANALYSIS NUMBER	CU	SI	FE	MN	MG	ZN	TI	GA	NI	PB	SN	BI	V	CR
767 (S) 10-196701A		**767	0.25	0.60	0.17	0.02	0.91	0.00	0.01	0.01		0.000	0.000	0.000		0.079

ALUMINUM WAS MANUFACTURED AND MILL ANALYSIS MADE BY:
(S) SHAWINIGAN WORKS, ALCAN ALUMINUM, CANADA.

THE ORIGINALS OF CERTIFIED MILL ANALYSIS REPORTS ARE IN THE FILES OF THE MANUFACTURERS.

* APPLICABLE CODES ARE STAMPED INTO EACH CYLINDER

SIGNATURE



ARROWHEAD INDUSTRIAL SERVICES USA, INC.
RIVERSIDE, CALIFORNIA

REPORT OF MANUFACTURE OF FRP SEAMLESS ALUMINUM-LINED CYLINDERS
RECORD OF PHYSICAL TESTS OF MATERIAL FOR CYLINDER LINERS

MANUFACTURED BY: LUXFER COMPOSITE CYLINDERS DIVISION
FOR: DART

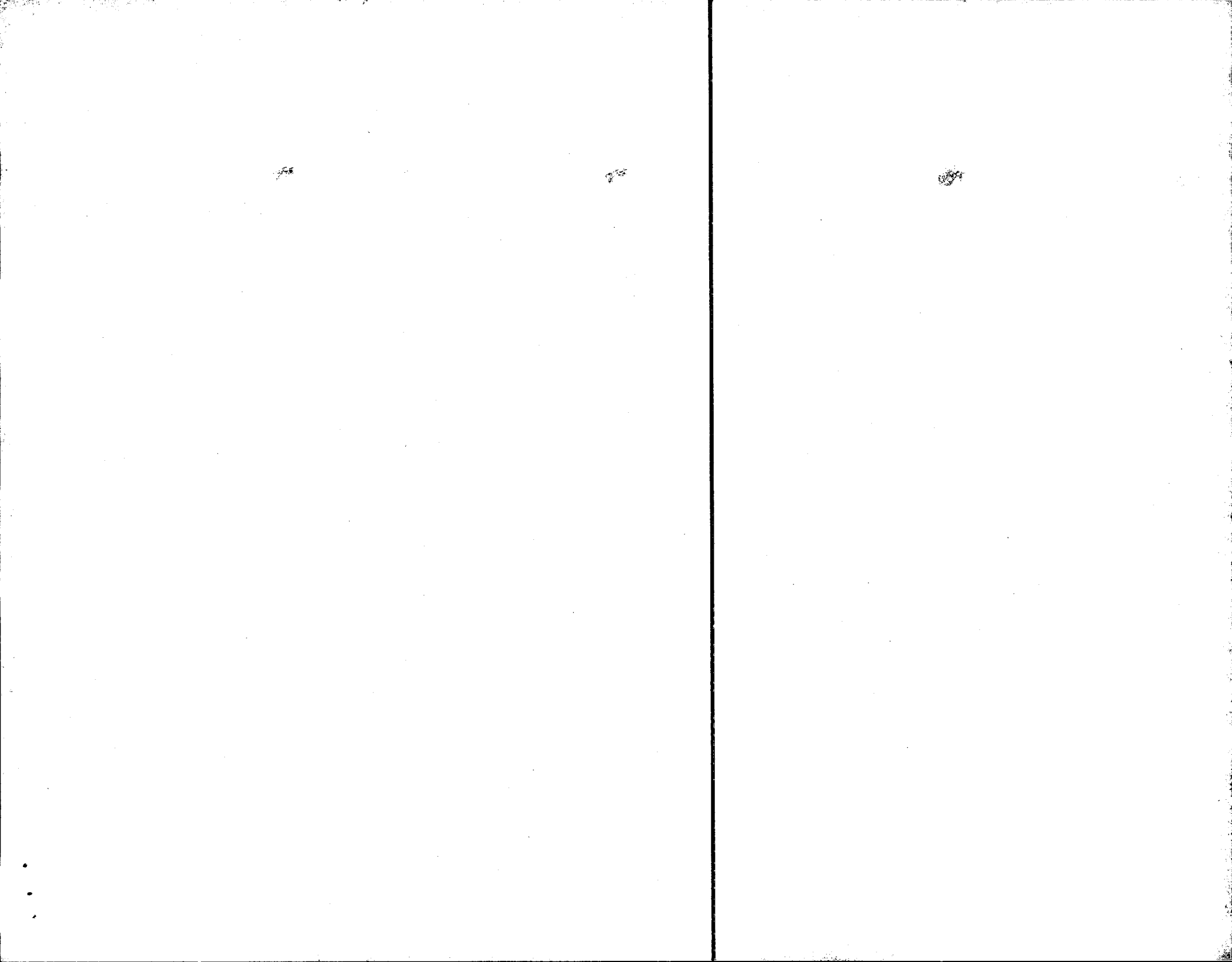
Reporting Date: 20 Apr 2011
Symbol: LUXFER

NUMBERED WS5349 to WS5353 inclusive.

LOT CODE*	CYLINDERS REPRESENTED BY TEST (SERIAL NUMBERS)	YIELD STRENGTH AT 0.2% OFFSET (POUNDS/SQ.IN.)	TENSILE STRENGTH (POUNDS/SQ.IN.)	ELONGATION % IN 2.0"***	ROCKWELL "B" HARDNESS TEST	1-1/2" RADIUS FLATTENING
S258	WS5350 THRU WS5353	45683 45640	52404 52357	18.0 17.0	N/A N/A	PASSED 9T FLAT TEST
S259	WS5349 THRU WS5349	45162 45562	52476 52527	19.0 18.0	N/A N/A	PASSED 9T FLAT TEST

* APPLICABLE CODES ARE STAMPED INTO EACH CYLINDER
** TENSILE TESTS MADE ON 0.5" WIDTH BY 2.0" GAUGE LENGTH. ASTM B557

SIGNATURE



ARROWHEAD INDUSTRIAL SERVICES USA, INC.
RIVERSIDE, CALIFORNIA

REPORT OF MANUFACTURE OF FRP SEAMLESS ALUMINUM-LINED CYLINDERS
RECORD OF COMPOSITE ANALYSIS

MANUFACTURED BY: LUXFER COMPOSITE CYLINDERS DIVISION
FOR: DART

Reporting Date: 20 Apr 2011
Symbol: LUXFER

NUMBERED WS5349 to WS5353 inclusive.

Filament designation and specification: S-2 449AA-750

Filament manufactured by: AGY LLC, CHARLOTTE, NC

MANUFACTURING LOT NUMBER	NUMBER TENSILE STRENGTH	INTERLAMINAR SHEAR
In House Number: 267 SE75012011 WS5349/WS5353	545901 PSI	6663 PSI after 4 hours water boil

RESIN SYSTEMS COMPONENTS AND MANUFACTURING LOT NUMBERS

Resin designation: BISPHENOL A

Resin manufactured by: HEXION OIL, HOUSTON, TX

RESIN		CURING AGENT		AIR RELEASE	
TYPE	LOT NUMBER	TYPE	LOT NUMBER	TYPE	LOT NUMBER
EPON 826	DP1B1614 WS5349/WS5353	T-403	1A119 WS5349/WS5353	BYK-A 501	1204508 WS5349/WS5353

SIGNATURE

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
RIVERSIDE, CALIFORNIA

REPORT OF MANUFACTURE OF FRP SEAMLESS ALUMINUM-LINED CYLINDERS

MANUFACTURED BY: LUXFER COMPOSITE CYLINDERS DIVISION
FOR: DART

Reporting Date: 20 Apr 2011
Symbol: LUXFER

NUMBERED WS5349 to WS5353 inclusive.

CYCLE TEST S/N WS5351 Lot # WS167
Cylinder Weight 16.04 lbs
Pressurization Range approx. 0 to 3000 PSIG
Number of cycles applied 10010
Pressurization Range approx. 0 to 5000 PSIG
Number of cycles applied 33
Pressurization rate 4 cycles a minute
Achieved burst pressure after cycling: 8900 PSIG

SIGNATURE 

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
RIVERSIDE, CALIFORNIA


REPORT OF MANUFACTURE OF FRP SEAMLESS ALUMINUM-LINED CYLINDERS
WEIGHT AND HYDROSTATIC TEST DATA FOR FRP COMPRESSED GAS CYLINDERS

MANUFACTURED BY: LUXFER COMPOSITE CYLINDERS DIVISION
FOR: DART

REPORT DATE: 20 Apr 2011

SYMBOL: LUXFER

LOT NO: WS167
P/N: L62W

NUMBERED WS5349  WS5353 inclusive.
ALL CYLINDERS WEIGHED WITHOUT VALVE AND PAINT
**CYLINDER PREVIOUSLY EXPOSED TO AUTOFRETTAGE
* RETESTED AT: 5100 PSI

AUTOFRETTAGE PRESSURE: 5500 PSI
HYDROSTATIC TEST PRESSURE: 5000 PSI

Heat Treat Insp Lot #	Mat. Code	Serial Number	WEIGHT			Volume Cu. In.	AUTOFRETTAGE		HYDROSTATIC			RATIO Perm/ Total	Test Date
			Liner	Comp.	Empty		Total Exp.	Perm Exp.	Total Exp.	Perm Exp.	Elas. Exp.		
S259	767	WS5349	14.81	1.27	16.08	555.3	192	91	93.5	0.6	92.9	0.64	16 Apr 2011
S258	767	WS5350	14.72	1.30	16.02	558.1	187	86	95.1	0.6	94.5	0.63	16 Apr 2011
S258	767	WS5351	14.74	1.30	16.04	556.9	188	84	95.5	0.5	95.0	0.52	14 Apr 2011
S258	767	WS5352	14.71	1.27	15.98	556.9	187	86	93.6	0.8	92.8	0.85	16 Apr 2011
S258	767	WS5353	14.71	1.27	15.98	557.5	193	92	94.5	0.9	93.6	0.95	16 Apr 2011

SIGNATURE 